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ABSTRACT

The universal clock reading in the topological measuring and global scaling of socio-economic data is a methodical problem-generation of pattern recognition and prediction. The key factors and indicators of global wave compression are identified, with special attention to global monetary wave theory and quantum economic science as world historic bifurcation. Decision tree learning and data science strategies are discussed for dynamic communication with the natural hierarchy, sequence and temporality of entropic order or chaos, pointing to a distinction between ‘general’ and ‘specific’ statistical learning. The role of entropology as a natural metaphor for the integrated perception, observation and measurement of the psychophysical body of the human social economy is exactly defined and precise methodical thought is elaborated for economic theory and management practice.

Key-words: global wave compression, monetary production economy, market replicator, universal clock, local topology, global scaling, bifurcation, entropology, economic method, statistical intuition.

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Every major economic crisis of human productivity is also a social reoccurrence of resembling historical events as a psychopathological and political **déjà vu, leading to extreme income inequality, radical societal conflict, public revolution and imperial inter-state war**; the reason for the social disillusionment of the 7 billion people agenda among all existing political systems, including the small number of liberal democracies, is the not to well-known or ignored fact that **politics is actually about the distribution of living chances** in this earthly realm where death is real and loss is not only an accounting category. An aggressive over-expansion and super-dominance of the financial industry sector in a monetary production economy and the resulting progressive collective **centralization (1:25%-10:90%)** of wealth and income among a low digit (1-10%) of a population are recipes for ethical and economic failure of the human race on a global ecological scale. The big data are showing the same extremes as around 1929, but this time every-thing appears even a great bit sharper in the process phenomena of curves, diagrams and graphics, but also big data science analytics cannot compute away the mathematical and statistical anomalies of economic production and distribution. The new economy illusion lost its psychological momentum ultimately at the end of 2000, regarding data of real GDP growth, new orders for durable goods, industrial production and non-financial corporate

profits; the profits of the Nasdaq-firms collapsed completely. In any case, quantitative economics and quantified data are historical approximations of real events in a post mortem style, but seem to give us in fact very limited insight about the happenings of the future or the immediate present. This methodical type of forecasting is too deterministic and futures research should be about the methodological freedom of human choice; consequently, we are investigating into the **basic pattern recognition and prediction** of human socio-economic action; our social life is about value priorities and time preferences as individuals and as collectives of learning and action.

Furthermore, it is an empirical fact that most scientifically collected and academically administered knowledge bodies about economic life cycles are directed at the **productive maximization of property via credit and interest**, especially instructing about how to operate profitably in the **market of a national polity**. At least $\frac{3}{4}$ of the professional literature is dealing with this kind of economic inquiry. As stated before, the methodical tools are mainly based on a **mathematical hermeneutics** that implies strong a posteriori power and condenses big data better than linguistic word chains, but a lot

of the lacking foresight is caused by this naïve belief in numeric modeling. Although the yuppies of the City preferred the Porsche 911 since 1995, it is not reasonable to assume a numerological connection to the terror of 9/11; however, the timing of this uncivilized murder act is more frightening the author today than at the actual moment, because of the analyzed criminal sophistication perceived in the retro perspective analysis of the (global) financial data series. Unfortunately, the economics and management professions have still not arrived at a truly scientific theory and method to integrate the many scattered practical knowledge pieces; this can only be done via a scientific learning process where dogmatic canonization does not dictate the road of research and development into new economic ideas that go far beyond the a posteriori balance sheets of static accounting and dynamic forecasting. We are following the **spiral theory of human history**, all social change is cyclical, not merely repetitive and linear projections cannot catch these continuous creative and destructive changes of cyclical hierarchies, from the beginning to the end of this world, pointing to the origin and nature of space, time, energy, matter and organized life itself. In addition, any *backward reading of time* or temporal re-construction carries the methodical problem that the cyclical intervals of temporal quanta are becoming shorter with the spiral course of history, i.e. if we count back from year 2000 to 1950, we get

the numerical value of 50, but this does *not* comply with the physical evidence of modern cosmology and temporology. The mathematical measurement of **global wave patterns** like Schumpeterian and Kondratieff cycles for a **world economic science** cannot ignore the socio-dynamic fact of physical **space-time compression or spatio-temporal acceleration**; the scientific methodical recognition and prediction of socio-economic wave patterns starts with physical evidence, must incorporate psychological preferences and cannot avoid philosophical ethics. Economics is also about the heuristic art to make the best of our lives and there is a definite calculus between personal greed and mutual prosperity; or to com-put it into more exact terms: book-keeping techniques ‘create’ economic facts. The physical **entropy** of an economic (quantum) system is directly affected by the accounting method (from stones to electronic digits), i.e. there is no economic alchemy or monetary meta-physics; furthermore, there is no natural law that an economy shall or could satisfy all human needs and wants. All that exists in the economic sphere of commercial trans-actions is physical demand and the monetary power to pay for need and want; it is exactly typical for our economic (quantum) stage, that all human needs are reduced or simplified into the need for **money**.

Quantitative economic history reveals that the advent of industrial capitalism has led to ever lower reserve requirements on demand deposits (also cash reserve ratio or minimal capital ratio), this monetary practice evolved with goldsmith and Lombard techniques of economic deposits as precious metals, gems, etc. in combination with written receipts; the most **advanced monetary production economies** have arrived at 0 or 1%, emerging economies like Brazil or China are around 20%. Central banks have become planning agencies to control the empty credit emissions and interest collecting of commercial banks; such a monetary practice is an attack on the growth of the market economy and checks economic productivity. **Economic production quantizes time and money quantizes economic production time**, i.e. the empty credit(x interest) emissions are the root cause of the global economic crisis and no monetary agency can check this toll on economic production as money is actually a market replicator. What makes this economic scenario even worse is the fact that about 70% of the empty emissions are fiat credits for real estate, being propelled by land value speculation in urban centers, i.e. an eminent mass of future productive capital is directed at a piece of land and housing. Under these financial conditions, the economic production cycle is shortened and a temporal acceleration to point zero is foreseeable. Only a **new**

politics of money can amend this systemic error and methodical mischief as **all human needs are reduced or simplified into the need for money as production and distribution mechanism**. Thus we propose some kind of optimal (narrow) reserve banking system for the future, to channel a **maximal capital ratio** into real economic investment for private entrepreneurship and public infrastructure.

The new economy illusion has also led to a misperception and misreading of the **electronic informatization** of the global village; computer technology does not signal a new economy, but it can create perfect information machinery and finalize the industrialization process as a global wave in form of tech-know-logical automation and automata. However, such innovations have at first to go through a painful human **learning curve** and an economic gain in real capitalization is almost a generational learning process of skills, competences and changing life styles, i.e. investment into people and human capital is a social learning program. In addition, also new management arts and entrepreneurial alertness do not fall from heaven and many people will have human problems with open source learning and knowledge sharing as they are conditioned by the old ways of doing the business (of life and work).

Contrary to new economy speech, the old natural laws (quantum motion & development) of the economy will govern in the future and this is the reason why it makes sense to recognize and predict the wave patterns of human economic behavior (time-value-decisions) which must always be guided by explicit ethical principles ('spiritual physics'). It is this existential interaction of the internal state of our **minds** with **physical constraints** that makes economic research so exiting and vitally interesting.

The last century was the century of the greatest **inflations of paper money** ever seen in human economic history, while the 19th century was a period of monetary deflations backed by precious metals. Is the quantum of inflation the **entropic indicator** of an economic system? We claim that the real causes of this quantum movements and developments, that direct the degree of socio-economic order or disorder, are scientifically not well understood or precisely researched. The cognitive framework or mental state of the **economic mind** that tries to explain human progress via the mathematized maximization of property via (fiat) credit (x interest) does simply not allow for such a perception of social systemic processes, i.e. it is a technically competent profession, but not a science. Quantum thought tries to comprehend human

economic action as the dual interplay of micro- and macro-kinetic processes of human thermodynamics (macro) and mechanics (micro) that causes meta-cyclical motion; it diagnoses the psychophysiology of the body economic as a **hologram**. Every single act of payment (micro=mechanical level) directs total production (macro=thermodynamic level); however, this economic actions do happen in a meta-cyclical framework of natural law as progressive space-time-compression or spatio-temporal acceleration (Carmeli 2002; *and*: arXiv:astro-ph/0103008v1: Lengths of the First days of the Universe). The **universal economic clock** flows in relative cosmological time (with a special metric of elastic backward motion) and directs the contractive and expansive cybernetics of the open global economic clock and the many closed local clocks, i.e. the universal hologram (4D) records the economic workings of the geometric globe (3D) and the arithmetic locations (1-2D). Consequently, there is a precise methodical distinction between the technical perspective of world economic science and the practiced economist professions; it was Levi-Strauss (1961: 397) who first coined the term **entropology** for the entropic actions of the human race, a process theory that studies the dynamic disintegration and increasing disorder of highly evolved social systems: it was no coincidence that these entropo-logical observations were actually formed in the 1930s in the Brazilian rain forest and as

visiting research scholar at Sao Paulo University, being together with F.Braudel on a French cultural 'mission'. In any case, the economic relationship between entropology and money in the last 250 years has to be studied in more scientific depth, but our methodical intuition points to an enigmatic monetary mechanism, concerning the entropy of our human economy. In our perception, entropology is driven by the following core factors:

A: **Population** (*dynamics*);

B: **Innovation** (*patterns*);

C: **Energy** (*consumption*);

D: **Money** (*reserves*);

E: **Complexity** (*acceleration*).

These *entropological factors* occur in a specific temporal order of events and imply a **sequential causal chain**; the historical, empirical and prospective reading of these basic quanta is the methodical key to decipher the meaning of the hidden motion in the order of space, time and human action via data science, big analytics and visual modeling. The outcome will not be a world formula or theory of everything, but **future economics in application**. *G.Plekhanov* taught that the *criterion* of any *human ideal or idea is economic reality* and that intellectual

beauty cannot be equated with scientific truth; the macro kinetic order in the cyclical and spiral nature of hierarchical processes is closer to Kondratieff wave theory of innovation than to a Bolshevik end game of history, but socio-economic evolution and selection procedures move in cybernetic feedback temporality on and this objective systemic algorithms do not ask for subjective pain of victims and human suffering as non-reversibility is the process class. The instant suspension of the gold reserve standard in WW1 was not a Wallerstein bifurcation; it was a sudden mutual event of the German Kaiser Reich and the United Kingdom of Great Britain on August 4, 1914: **only paper money could make for a longer war**, postponing all ideal aspirations of *universal human emancipation*, installing war as a special case of global systems evolution. In economic reality, the orbit of the market forces deviates extremely from any ideal mathematized equilibriums and only a **reasonable politics (of money)** can balance the antagonistic market capacities of the competing political economies, i.e. the market can activate the funeral service if the patient is dying and the most expensive economic service is the state funeral. The temporal metaphor of Kondratieff wave motion and development can be understood as **statistical hermeneutics** of socio-economic systemic processes in the polity and the market; it is the temporal order of sequential factors (population/dynamics, innovation/patterns,

energy/consumption, money/reserves and complexity/compression) and their possible fractalization where the methodical rules of empirical statistics are no more applicable in the usual reading of events. After WW1 it was indeed foolish to restore old gold parities as the economic parameters had **forever** changed; institutions like the gold commission of the League of Nations and afterwards the Bank of International Settlements were mentally simply not prepared for a methodical shift to new monetary standards. We are sure that this *non-reversible event* can be studied by the social scientific method and that it can be interpreted statistically via the mechanical and thermodynamic entropy of the quantum system of the world economy as fractal stage. Of course, this immediately calls for an applicable theory of bifurcation in extreme income inequality, radical social conflict, public revolution, imperial inter-state war and hopefully world peace for trade and change; it also implies the unavoidable question of human liberty and solidarity and their relatively limited **degrees of freedom in social inter-action**, i.e. the dynamic and efficient interplay of physical constraint and human economic action (or our internal state of minds).

An ideological overestimation of the human freedom of action in the social world generally finalizes in the unreasonable

notion that social science should methodically not be tight to the **application or higher order of natural law, to achieving a more exact or precise discipline**. We do not think that socio-economic research and development can be solely built upon *hermeneutic interpretation and mathematized artifacts*; on the contrary, we propose to empirically extract abstract information (patterns) and modeling (regularities) from **big data science** and *knowledge discovery* in data set bases. Statistical interpretation and data visualization are at the core of this mathematical creativity, concerning the **data mining and decision tree learning** of regular patterns as discrete classification or continuous regression of events/parameters on a temporal scale. The quantization and quantification of qualitative entropic tendencies identifies the un-certainty and randomness of systemic processes in the order of time; general formulae for **data redundancy measurement** do exist as social entropy indexes, e.g. for income inequality research. Thus methodical ingenuity can open up new social research ways into the global scientific analysis of economic wave patterns, regularities and space-time. The **statistical learning problem** of regular inference and prediction in pattern recognition is the background program for the methodical detection of **discrete waves** and **continuous elements** on the economic radar of the social evolution in the history and future of the world system. The empirical intelligence of methodical statistics and

probability is *field and path dependent*; the precise observation of rapid evolutionary change in human social systems is therefore bound to the exact methodical distinction between regular and non-regular statistics, i.e. every form of counting is finite, but different velocities or time-scales do apply for measuring the clock signals of distinct data sets.

Disease, disaster and death are real human **bifurcations of order or chaos**; E.Schrödinger insisted permanently on the empirical fact that a rapidly progressing degree of entropy causes the mortal crisis of organized life. Advancing methodical mathematics beyond intellectual beauty works by heuristic intuition and finally via logical proof; cybernetic signal processing in living social systems can better be researched into by *non-deterministic maths* and *intuitive modeling*. In the living case of process-learning, cause and effect are not always proportional; the non-linear relationships may depend on simple initial conditions accompanied by extreme high sensitivity of a process momentum. Pattern recognition is bound to *data as vectors of multiple dimensions*; data dimensionality estimation models of a mathematical set become therefore empirically crucial. In addition, the statistical and probabilistic interplay of local data

samples with whole data sets calls for a methodical integration of *topological and global scaling*. Consequently, multi-fractal meters of complexity change are always signaling changes in detail and scale at the same time; however, low cardinality and high dimensionality in the same mathematical set of data remain an open measuring problem and more methodical exactness in measuring techniques is still a creative guess. The *economic management* of physical bifurcation and chaos in a complex social system depends on the precise perception, observation and exact measurement of the appropriate general time- scale and specific ‘data clocks’; this is the great methodical challenge of social scientific research in our current age of ***global wave compression*** in the social economy of world humanity.

Will we be all buried in Polya’s urn? A Chinese restaurant or Indian buffet process is preferable, but what can be done? Any human social system is an open and non-reversible thermodynamic set and the entropic acceleration of the political economy in the world system started in the early 1970s, with the **monetary fiat big bang**. Since then, population dynamics and energy consumption doubled in total terms, the driving innovation pattern became auto-electronic information-processing and the monetary reserve requirement ratio points to

minus 0, with the exception of some 'emerging' economies. Complexity globally multiplies via space-time compression and can only be communicated methodically, but it cannot be 'controlled' by *socio-economic engineering*. In addition, global scaling and topological measuring are not logical identities, but are governed by *universal natural laws* of space, time and energy. Peace, health and prosperity are dependent on a social balance of liberty and solidarity, i.e. free association and social ethics. Therefore, it is decisive to revive modern liberal thought for *political economics* and *social philosophy*. Socialism for the rich and capitalism for the poor is no solution (private gain=public loss), i.e. organized pockets of wealth vs. disintegrated pools of poverty; the land/natural resource and state/tax monopoly has to be reviewed scientifically, but it is radically more important to rethink the private monetary monopoly of fiat credit (x interest) and public monetary police. The author has the powerful metaphor in mind, of a triangular formation body of birds, where the strongest fly in front and create the waves that carry those behind who are weaker or tired; another natural metaphor is stork thermic: even the carnivore stork knows how to use the thermodynamic waves where every organism can realize his full potential and where great group co-operation is of more evolutionary benefit than *un-natural* over-competition.

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